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NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

# THE NPIC EQUIPMENT SUMMARY 1970

(INTERIM EDITION)

DECLASS REVIEW by NGA/DOD

SECRET

NPIC/R-50/70 OCTOBER 1970 2

#### Approved For Release 2004/02/11: CIA-RDP78B05703A000100070007-1

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# THE NPIC EQUIPMENT SUMMARY 1970

(Interim Edition)

OCTOBER 1970

Prepared by the Technical Services Group

NATIONAL PHOTOGRAPHIC INTERPRETATION CENTER

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110.6.6044444106		USAMC	1	HQ TAC (DIR)	1
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PACAF				ASD (ASR)	4
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DIAXX-3A	2	FICLANT	1	SAMSO	4
DIAAP-9C	2	CG FMF PACIFIC	1	2 RTS (DI)	1
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DIACC-1C	1	CNO (OP-07TB)	2	15 RTS (DI)	1
DIAAP-1D	1	CNO (OP-724)	1	67 RTS	1
DIAAP-1E	1	CNO (OP-03R3)	i	432 RTS	1
DIAMC-5	1	CNO (OP-92B)	1	12 RITS	1
DRD-LOC	1	COMDT USMC A02	1	544 ARTW	7
		NAVAL AIR SYSTEMS	3	548 RTG	2
ARMY		COMMAND (AIR 5391)	•	480 RTG	2
ARM I		(AIR 53714) (AIR 538)		Air University (AUL3T)	1
Army War College	1	COMNAVINTCOM (NIC-2)	2	mom. r	
CONARC	î	NAVOCEANO (Code 7100)	2	TOTAL	176
OACSI-OC	2	NAV RECON TECH SUPP	5		
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OACSI-T	1	NAVPHOTOCEN	2		
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# THE NPIC EQUIPMENT SUMMARY 1970 (INTERIM EDITION)

The National Photographic Interpretation Center (NPIC) is responsible for conducting an active program of development of equipment and techniques to improve and advance the exploitation of imagery in support of the national intelligence effort. The development of new systems, instruments, materials, and devices for imagery exploitation includes a wide range of optical-mechanical and electronic instrumentation as well as the application of automated systems for the extraction of data from photographic and other image-forming sensors. In addition, the Center provides technical advice and support to other government components responsible for the development of new systems for intelligence collection and coordinates its research and development activity with interested elements of the intelligence community for their own use or further adaption.

Within NPIC, the Technical Services Group (TSG) is responsible for performing research and development on materials, techniques, and equipment which will ensure timely, effective, and economic imagery exploitation. The purpose of this publication is to convey some of the results of this work as well as plans for future R&D. The publication also includes information about intelligence equipment developed elsewhere, but in use at NPIC. Each item of equipment is described by a short narrative, a photograph or conceptual drawing, and a tabulation of physical characteristics. Where available, the approximate cost of the equipment is given. However, these figures should be used with care, as prices may change and quantity buying may reduce cost.

Please note that in 1970 we are only publishing this interim edition, which contains information on only those current development or production items which have come into being since the publication of the 1969 edition. It is planned to resume the publication of regular, complete editions in 1971.

The items listed in this publication are grouped into three sections as follows:

- 1. Reproduction and Processing
- 2. Viewing and Interpretation
- 3. Measurement and Evaluation

In addition, an appendix is included containing a bibliography of Test and Evaluation Reports on certain items of equipment. Where a Test and Evaluation Report has been prepared (or is in preparation), a note to this effect will be found on the page depicting the equipment.

Your comments and criticisms are solicited in order to continually improve this publication. Individuals or organizations are encouraged to request additional information concerning any of the equipment or reports listed.

The overall classification of this report is SECRET. Individual UNCLASSIFIED items carry the caveat "(This item is UNCLASSIFIED)"

#### WARNING

NO CONTACT IS TO BE MADE WITH ANY MANUFACTURERS REGARDING CLASSIFIED ITEMS WITHOUT PRIOR APPROVAL BY NPIC. DIRECT CONTACT MAY BE MADE WITH THE MANUFACTURER REGARDING UNCLASSIFIED ITEMS. HOWEVER, NO REFERENCE TO NPIC OR THIS PUBLICATION SHOULD BE MADE WITHOUT PRIOR APPROVAL

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**SECTION I. REPRODUCTION AND PROCESSING** 

### PROTOTYPE 40 INCH DRY SILVER PAPER PROCESSOR

(This item is UNCLASSIFIED)

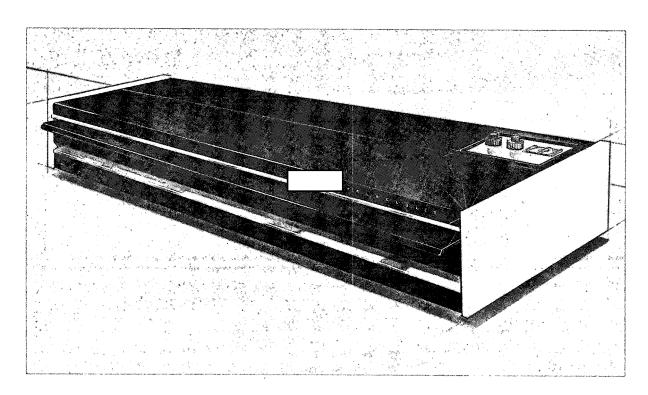
This processor is designed specifically to process \_\_\_Dry Silver photographic paper in sheet or roll form up to 40 inches in width. This unit completely processes and fixes

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enlargements in a single step at a nominal rate of approximately one inch/second. Processing temperature and dwell time can be controlled independently to provide processing variability.



Cost: Undetermined

Weight: Approximately 60 lbs.

Size: H 15 in. W 20 in. L 46 in. Power Requirements: 115 V, 60 Hertz, 20 A

T & E report scheduled

Special Requirements: Darkroom

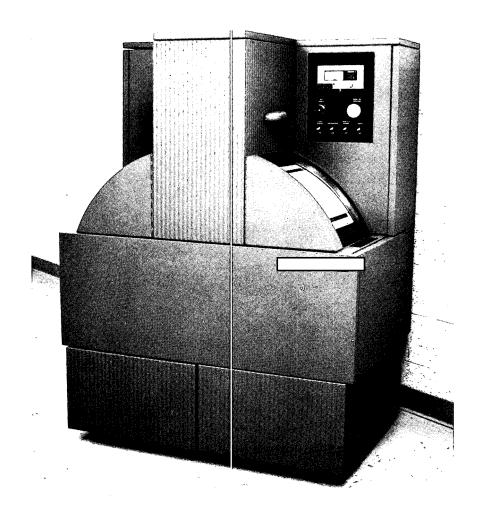
Status: Pre-Contract

**Development Source: NPIC** 

#### PROTOTYPE 9 ½ INCH SILVER SHEET FILM PROCESSOR

(This item is UNCLASSIFIED)

controlled carrier, and associated fine tuning controls. The unit will handle sheet film up to  $9\frac{1}{2}$  by  $9\frac{1}{2}$ -inch size. It will also process Dry Silver paper as well as Dry Diazo ("Therma Tone") in sheet form.



Cost: Undetermined
Weight: Undetermined

Size: H 60 in. W 30 in. L 60 in.

Power Requirements: 115 V, 60 Hertz, 20 A

T & E report scheduled

Special Requirements: None

Status: Pre-contract

**Development Source: NPIC** 

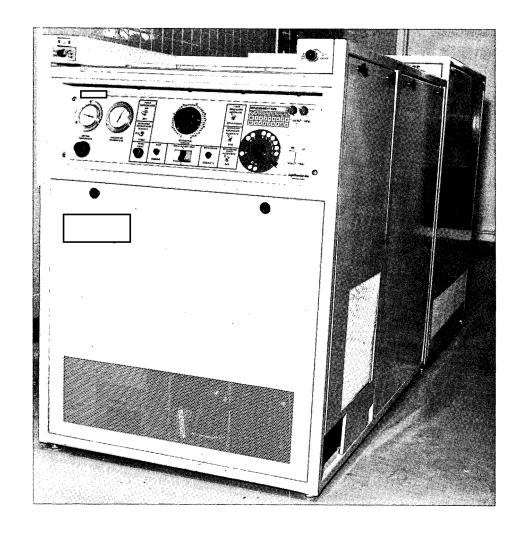
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#### CONTINUOUS TONE FILM PROCESSOR

(This item is UNCLASSIFIED)

The model C-24 processor will accommodate any film base thickness from 0.0004 to 0.008 inch and a minimum film size of 4 by 10 inches. The processor is an automated roller-belt transport system for developing, fixing, washing and

drying of continuous tone films. It accepts film without leaders in lengths from 10 to 30 inches and in widths from 4 to 24 inches. Development time varies from 1 to 6 minutes. Speed varies from  $9\frac{1}{2}$  to  $57\frac{1}{2}$  inches per minute.



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Weight: 2,317 lbs.

Size: H 51 in. W 35 in. L 99 in.

Power Requirements: 110 V, 60 A

Special Requirements: Darkroom Status: Commercially available Development Source: Commercial

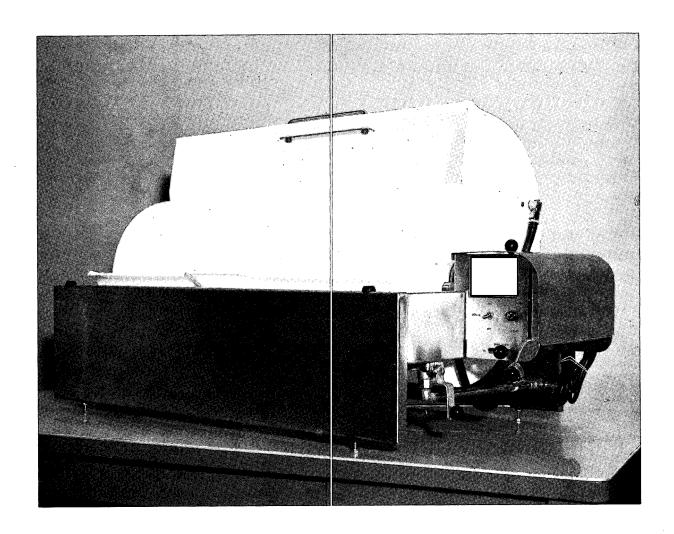
#### COLOR PRINT PROCESSOR

(This item is UNCLASSIFIED)

This equipment is capable of processing a 30 by 40 inch print in color or black and white in  $7\frac{1}{2}$  minutes. It is also used to process multiple color and black and white prints in sizes of 8 by 10, 9 by 9, 11 by 14, 16 by 20 inches, etc. Color and black and white prints can be processed

simultaneously. Up to twelve 8 by 10 prints or any combination of sizes can be processed at the same time. The machine is portable and can be moved from room to room. It can be set up for operation in less than 5 minutes.

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**Size: H** 46 5/8 in.

Weight: 82 lbs.

W 22 1/2 in. L 25 1/2 in.

Power Requirements: 115 V, 60 Hertz 100 W

Special Requirements: Darkroom Status: Commercially available Development Source: Commercial

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### SECTION II. VIEWING AND INTERPRETATION

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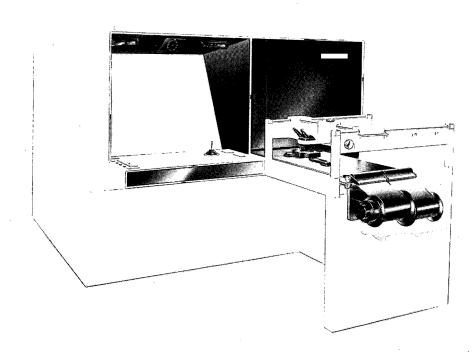
#### SCAN AND SEARCH PI STATION

(This item is UNCLASSIFIED)

The purpose of the Scan & Search PI Station is to facilitate the scan & search function of large volumes of roll film on a rear projection screen - yet permit high-resolution, direct stereo viewing of small areas of interest through a stereomicroscope. The instrument will handle two rolls of film; either of which can be

viewed on the screen and automatically translated to the light table for detailed viewing. Magnification at the screen will be 4.5X and 20X with an anticipated resolution of 10 lines per millimeter (1/mm) on axis at 20X. However a promising development of a lenticular screen may raise the resolution above 15 1/mm.

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Weight: 1,300 lbs.

Size: H 76 in. W 67 in. L 76 in.

Power Requirements: 208 V, 3 phase, 4 wire Y

connection, 30 A per phase

**Special Requirements:** Air Conditioning

**Status:** Prototype in fabrication **Development Source:** NPIC

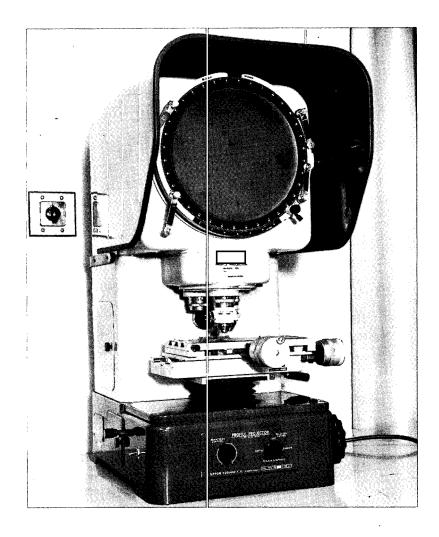
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#### PROFILE PROJECTOR - MODEL 6C

(This item is UNCLASSIFIED)

This camera is used primarily for reproduction of high resolution photographic copies of positive film. It resolves better than 100 line pairs per millimeter on Polaroid prints or positive film transparencies. Magnification ranges from 10 to 100X are used. Measurement of film imagery can be obtained by moving the micrometer handwheel and noting apparent motion of the image on the protractor screen.

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(Depending on Accessories)

Weight: 120 lbs.

Size: H 35 in. W 17 in. L 27 in.

Power Requirements: 110-120 V, 60 Hertz

Special Requirements: None Status: Commercially available Development Source: Commercial 5X1

#### RETROFIT FILM DRIVE SYSTEM FOR LIGHT TABLE

MIM 4

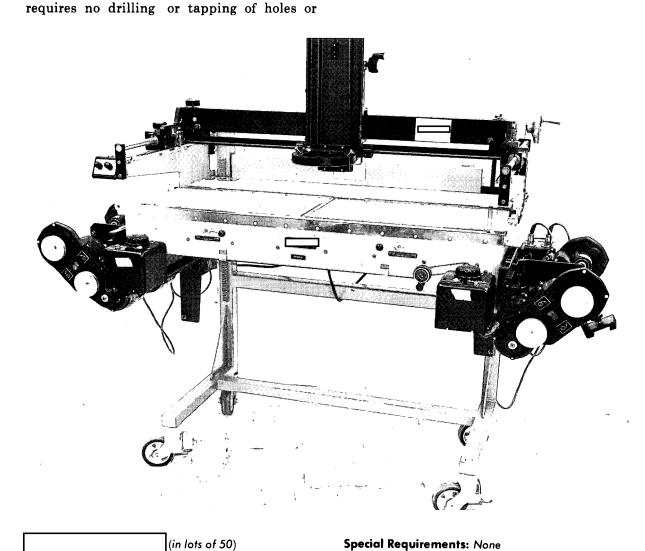
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(This item is UNCLASSIFIED)

5X1 has designed and built a film drive system which can be mounted on a **5**X1· MIM 4 Light Table. The drive system can be installed with simple hand tools and

internal electrical connections. The Intergraphic film drive can handle one or two rolls of film up to 1,000 feet by 9½ inches. The system is quiet, smooth, and easy to operate.



5X1

5X1

Weight: 120 lbs.

Size: Unit extends 10 inches beyond each side of the

table and 6 inches in front of table. Power Requirements: 117 V, 4 A

T&E report scheduled

Special Requirements: None

Status: Prototype under evaluation **Development Source: NPIC** 

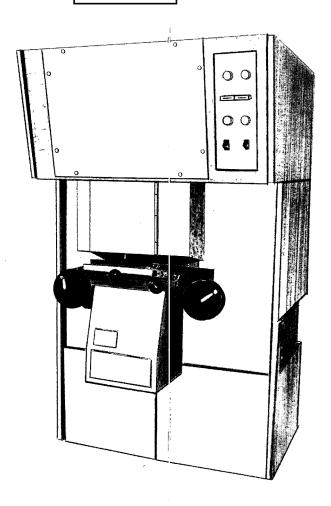
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#### DRY SILVER ENLARGER/VIEWER/PRINTER

(This item is UNCLASSIFIED)

This Dry Silver Enlarger/Reader/Printer will produce an enlarged image for viewing and/or an enlarged paper print at selected magnifications. The unit is designed to operate in roomlight conditions and uses

Dry Silver material for the quick print-out. It will accommodate input negatives in individual chips or sheets up to  $9\frac{1}{2}$  by  $9\frac{1}{2}$  inches or roll film from 75 millimeters to  $9\frac{1}{2}$  inches wide on mil standard spools.



Weight: 550 lbs.

Size: H 75 in. W 42 in. L 48 in.

Power Requirements: 115V, 60 Hertz, 20A

Special Requirements: None Status: Under Development Development Source: NPIC

#### **COLOR CONTROL CELL**

As one element in a program of related R&D projects to prepare for the special problems anticipated with an increase of high resolution color photography, a Color Control Cell (CCC) will be designed and built at NPIC. Within this standardized, calibrated "laboratory", we will test and evaluate viewing equipment and conduct psychophysical experiments to

determine the utility of color's hue and chroma for search/detection and target identification tasks. Although primarily experimental, the CCC may evolve into an operational configuration to directly support the PI and/or carry out photo-scientific assessments of color films.



Cost: Undetermined Weight: N/A Size: Undetermined

Power Requirements: Undetermined

Special Requirements: Luminaires containing

spectrally-adjustable illumination.

Status: Pre-contract

**Development Source: NPIC** 

SECTION III. MEASUREMENT AND EVALUATION

#### **AUTOMATIC TARGET INDEXING DEVICE**

This device operates on roll film at 100 feet per minute and, with an accurate target coordinate input, will provide a rapid reading on a target by target basis as to whether it is cloud covered, clear, or partially cloud covered. Although the film can accommodate any size from 35 millimeters to 9 inches the TID is

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currently configured for 6.6-inch wide film. The TID is controlled by a DDP-516 computer and is equipped with two magnetic tape units for input and output. In addition to its target indexing capability, the TID can also provide a percentage reading of cloud cover per frame of photography.



Weight: 2,000 lbs. (Main device only)
Size: H 70 in. W 33 in. L 101 in.

Power Requirements: 115 V, 60 A (total system)

Special Requirements: None

T&E report scheduled

Status: Prototype in fabrication

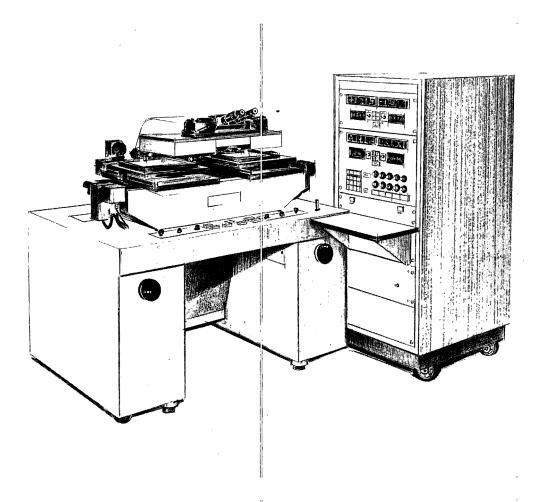
Development Source: Commercially developed to

meet NPIC stated requirements

#### 1740A (10 BY 10 INCH STAGE) STEREO COMPARATOR

The 1740A Stereo Comparator is being designed as a "work horse" Comparator for NPIC. The instrument will have two 10 by 10 inch stages; 2 micron or better accuracy with double-threaded lead screw; 10 to 100X magnification; image rotation; filter wheels for

color and intensity control of the illumination; joystick slew motion control and handwheel servo drives for fine motion control; and 4 axis encoders, counters, buffers and controls for direct on-line operation.



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Weight: Undetermined Size: Undetermined

Power Requirements: 110 V, 15 A

Special Requirements: None

Status: Under development, scheduled delivery June

1971

**Development Source: NPIC** 

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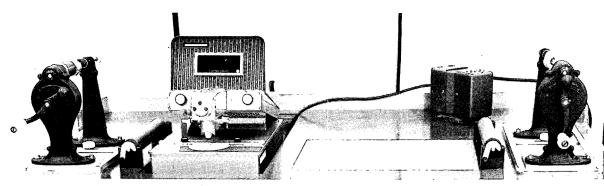
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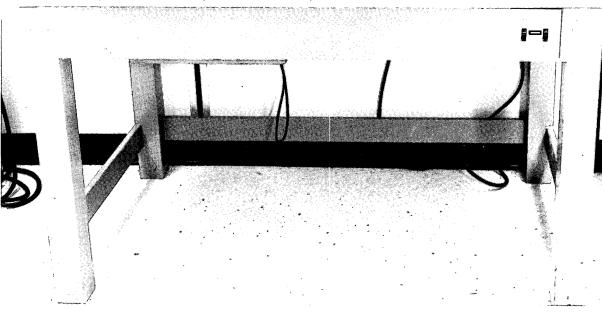
# QUANTALOG COLOR TRANSMISSION DENSITOMETER (TD 404AM)

(This item is UNCLASSIFIED)

This is a standard shelf item used to measure ASA visual diffuse transmission density. It is equipped with certified calibrated status A filters for reversal color films (filter turret in machine) and status M filters for color

negative material (not shown). It has a throat clearance of 11 inches and a fixed aperture of 4 millimeters. A three-digit display read-out eliminates errors due to optical parallax or eye fatigue.





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Weight: 24 lbs.

Size: H 11 in.

**W** 16 in.

L 10 in.

Power Requirements: 115/230 V, 50/60 Hertz

Special Requirements: 60 V.A. voltage regulator

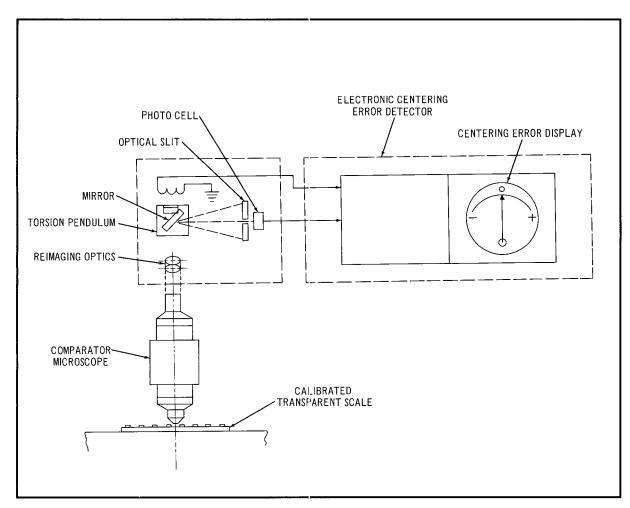
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**Status:** Commercially available **Development Source:** Commercial

## PROTOTYPE CALIBRATION DEVICE FOR HIGH PRECISION STEREO COMPARATOR

This device, which is being built by is aimed at providing a tool for the calibration of the High Precision Stereo Comparator to absolute standards that are traceable to, and certified by, the U.S. National

Bureau of Standards. It will operate on the principle of a vibrating scanning mirror and electronic phase matching. This electric nulling device will help reduce tedium and elimate human point errors.



CALIBRATION DEVICE GENERAL ARRANGEMENT

Weight: Undetermined
Size: Undetermined

Power Requirements: 110-115 V, 60 Hertz

Special Requirements: None Status: Under Development Development Source: NPIC

#### CHIP COMPARATOR MODIFICATIONS

(This item is UNCLASSIFIED)

Operation of the chip comparators has disclosed two major problems:

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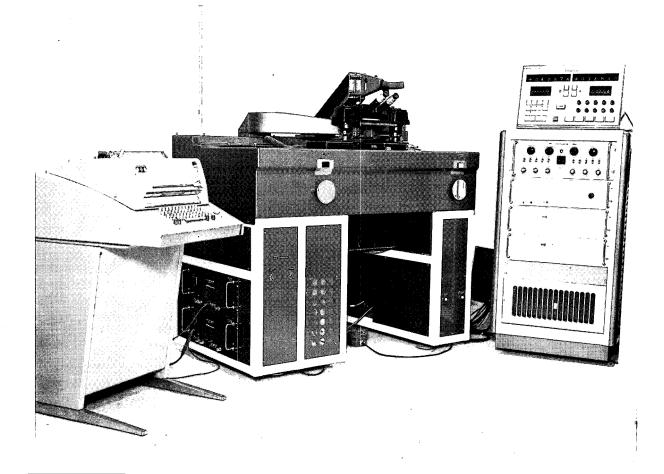
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- (1) Leakage of circulating water from the illumination cooling system sometimes disables the electrical system of the instrument. Furthermore, the decreased volume of water causes overheating and failure of the high-intensity illuminating lamp.
- (2) The mount for the optical viewing head of the instrument is unstable and makes it

impossible to maintain focus throughout the area of the film chip being viewed.

The modifications to the instrument call for the installation of sensors in the cooling system to indicate malfunction and the removal of power before damage to the high-intensity lamp can occur. Also, the present mount for the optical viewing head is replaced with a new and improved design.



Power Requirements: 115 V, 30 A

Special Requirements: None

Status: Operational

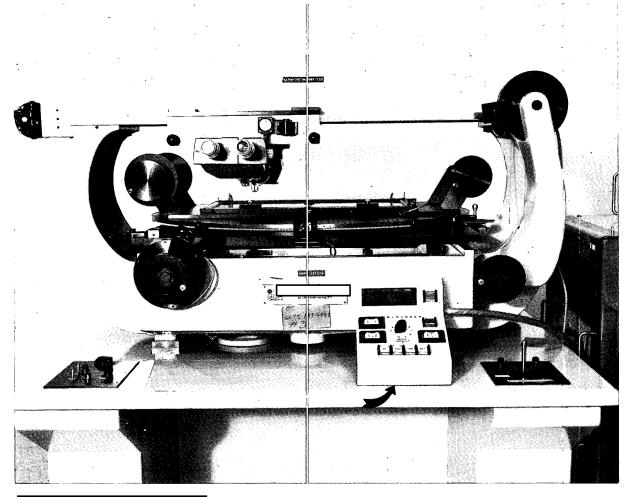
**Development Source: NPIC** 

#### REMOTE PANEL FOR ON LINE TERMINAL

(This item is UNCLASSIFIED)

This panel was designed to improve the efficiency of the mensuration operation on a Comparator. The panel automatically increments the identifying numbers associated with the points and areas measured on a photo. The remote panel operates in parallel with the main panel and can be turned on or off at will. By using the remote unit, an operator can input

a series of coordinates of the computer or card punch by depressing a switch once for each point. The points are automatically numbered sequentially and when the operator moves to a new area he depresses another switch which increments the area identification number and resets the point identifying number.



Weight: 10 lbs.

Size: H 6 in. W 7 in. L 8.5 in. Power Requirements: 117 V, 1 A

Special Requirements: None Status: Prototype under evaluation Development Source: NPIC 25X

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**T & E ANNEX** 

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#### ANNEX - BIBLIOGRAPHY OF T&E REPORTS

These documents are reports of acceptance testing, engineering evaluation, and operational suitability testing on prototype units developed by the NPIC research and development organization. If some phase of this testing cycle is deleted, or if procurement is other than R&D, it is so noted.

istribution list, or to other qualified organizations. Requests should be made through Technical ervices Group, NPIC. No reference should be made to NPIC or this publication without prior pproval.					

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#### Future Reports

The following items are expected to be delivered and/or T&E Reports are to be completed prior to the 1971 edition of the Equipment Summary. The community will be informed of report availability through EXRAND.

١.	Automatic Target Indexing Device (p. 11)
2.	Retrofit Film Drive System (p. 7)
3.	40 Inch Dry Silver Paper Processor (p. 1)
<b>4</b> . [	9½ Inch Dry Silver Sheet Film Processor (p. 2)
5. <b>[</b>	7X Filar Eyepiece Prototype. (p. 91, Equipment Summary 1969)